

Admission of Air to Rooms.

Air should be introduced and removed at those parts of the room where it would not cause a sensible draught. Air flowing against the body at, or even somewhat above, the temperature of the air of a room will cause an inconvenient draught, from the fact that, as it removes the moisture of the body, it causes evaporation or a sensation of cold. Air should never, as a rule, be introduced at or close to the floor level. The openings would be liable to be fouled with sweepings and dirt. The air, unless very much above the temperature of the air of the room, would produce a sensation of cold to the feet. It may be regarded as an axiom in ventilating and warming that the feet should be kept warm and the head be kept cool.

The orifices at which air is admitted should be above the level of the heads of persons occupying the room. The current of inflowing air should be directed toward the ceiling, and should either be as much subdivided as possible by means of numerous orifices, or be admitted through conical openings, with the smaller openings toward the outer air and the larger openings toward the room, by which means the air of the entering current is very rapidly dispersed. Air admitted near the ceiling very soon ceases to exist as a distinct current, and will be found at a very short distance from the inlet to have mingled with the general mass of the air, and to have attained the temperature of the room, partly owing to the larger mass of air in the room with which the inflowing current mingles, partly to the action of gravity in cases where the inflowing air is colder than the air in the room.—*D. Galton, in the Architect, London.*

Foreign Trade Marks—a Dilemma.

The Californian Fig Sirup Company, of Reno, Nevada, U. S., having registered the trade mark "Sirup of Figs" in the United States in 1885, demanded in January of this year to have the same mark registered in this country. In the Act of 1883 (Section 103) it is provided that, if her Majesty should be pleased to make any arrangement with the government of any foreign State for mutual protection of inventions, designs, and trade marks, then any person who has applied for protection for any invention, design, or trade mark, in any such State, should be entitled to a patent for his invention, or to registration of his design or trade mark (as the case may be), under this Act, in priority to other applicants; but in the case of a design or a trade mark, he must make his application within four months of his application in the foreign State. The same section, further on, provides that any trade mark the registration of which has been duly applied for in the country of origin may be registered under this Act. In March, 1884, her Majesty did please to accede to a convention to which France, Italy, Spain, and Belgium had previously agreed. The United States acceded in 1887. Article VI. of the convention thus acceded to provides that "every trade mark duly registered in the country of origin shall be admitted for registration, and protected in the form originally registered in all the other countries of the union." Under that article the California company claimed the registration of their trade mark "Sirup of Figs" in this country. The comptroller demurred, and argued that he was only bound by the Act of Parliament, and in that the limit of four months was clearly named, and had not been complied with by the applicants. They replied that in the convention such a limit was not mentioned, and they appealed to the board of trade, who referred the case to the court. The point at issue was evidently whether the convention should override the statute, or whether the statute ruled the convention. If the former, then we are bound to register every foreigner's trade mark here if he has got it on the register of one of the countries in the union. If the latter, we are in a degree breaking faith with the co-signers of the convention. Mr. Justice Stirling has ruled against the applicants, but he evidently perceived the dilemma, and said that her Majesty's government would no doubt consider what steps ought to be taken in the way of harmonizing the conflicting claims.—*The Chemist and Druggist (London).*

THE ELECTRIC BLOWPIPE.

BY SAMUEL SHELDON, PH.D., PROF. HARVARD UNIVERSITY.

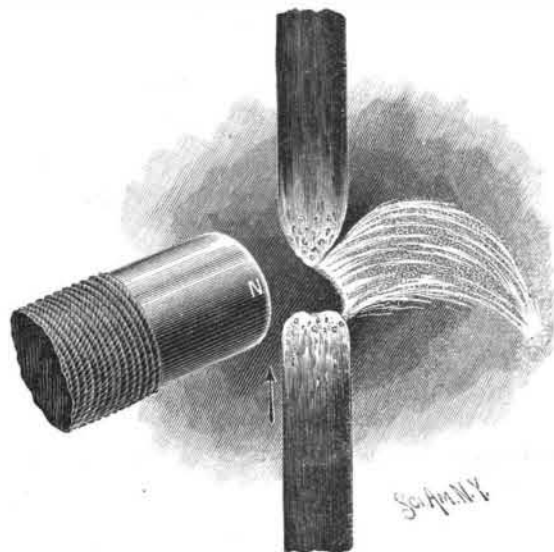
The application of dynamo-electric currents for the welding of large pieces of metal, in the mechanic arts, has been practically demonstrated as a success. But its employment has been, of necessity, limited to large workshops, where the amount of work of this character would warrant the purchase of a dynamo. Furthermore, the danger attending the use of powerful currents has deterred many from making use of them, because they have had in their employ mechanics of only ordinary attainments, with no especial knowledge of electricity.

Besides the Thomson-Houston system, which employs a current of very great strength but small electro-motive force, and where the pieces to be welded are brought into contact, two general methods employing the electric arc have been used. The first consists in

making an electrode of each of the pieces to be welded, a small space being left where the welding is to take place. If a strong current be sent through, it forms an arc of great heat at this space and the metals are melted, and, running together, form a compact whole. The second consists in connecting both of the parts to be welded to one end of the circuit, while the other end is connected to a movable point, which is brought into close proximity to the joint, and, the arc being formed, gives the same result as before.

For many pieces of work these methods are not practicable. For instance, oftentimes when two pieces are brought into their proper relative positions, if a current be sent through after the first method, arcs will be formed at several places, and junctures will be made in places not desired. Again, in the employment of the second method, the use of two hands is often essential in the manipulation of the work, in which case a second person is necessary to apply the second contact. It is well known that two persons cannot co-ordinate their movements in the efficient manner in which one can those of his two hands, and the result is often an inferior grade of workmanship.

Now, the peculiar behavior of the electric arc, when placed in a strong magnetic field, affords at once a simple and efficient means for welding. A dynamic attraction or repulsion occurs between the rectilinear current of the arc and the amperian currents of the field, and this results in the drawing or driving out of the arc into a point, which is very similar to the point of flame projected from a blowpipe. The form may be seen from the following sketch:



THE ELECTRIC BLOWPIPE.

The heat at the point of the arc is intense, and suffices to melt any of the metals. A piece of No. 14 copper wire held at the apex melts instantly.

This extreme heat in such a convenient form can be the means of bringing electro welding within the reach of all shops where arc lamps are employed for illumination. By a mere nominal alteration the lamp may be made to perform the double function of illumination and welding. To attain this end, a straight electro-magnet wound with coarse wire is only necessary. This is placed with one end toward the arc, and may be fixed in one position (to be determined by experiment, and depending upon the direction of the desired point of the arc), or made movable in a horizontal plane on a level with the arc. The two terminals of the magnet coil are inserted anywhere in the main circuit, or, if found necessary, may be shunted from the same. The connections, once made, can remain undisturbed, and, without influencing the main line, the lamp performs its two functions.

In the employment of the arc for electro welding, the operator must, of course, wear colored glasses for the protection of the eyes. Care must be used in the selection of these, for some of the coloring matter used (especially in blue and red glasses) absorbs the light given out at the apex of the arc, and this would be detrimental to fine work.

The electric arc, when in a strong magnetic field, exhibits another peculiarity. It is known that if a circuit, traversed by a strong current, be broken under ordinary circumstances, a moderate spark will ensue, accompanied by a snap similar to that given by a toy cap when exploded. If, however, the break be made in a strong magnetic field, an extremely large spark follows, accompanied by a peculiarly sibilant report, as intense as that of a pistol. The effect is very startling when unexpectedly made.

If a strong field be brought to bear upon the interrupter of the primary circuit of a Ruhmkorff coil, the spark emitted by the simple secondary coil equals in magnitude and length that which would be produced under ordinary circumstances were the secondary in communication with a large condenser. This simple means may often be employed to advantage in work with a Ruhmkorff, when a long spark is desirable and, at the same time, any electrostatic residue, owing to the condensers, is to be avoided.

THE PARIS EXHIBITION.

In June, 1883, a few French members of Parliament, among whom were MM. Herve-Mangon, Liouville, and Million, urged M. Herisson, minister of commerce, to consider the desirability of holding a national exhibition in Paris in 1885. Public discussions in the press and elsewhere followed, with the result that it was considered best to hold a "universal" exhibition in Paris in 1889, the centenary of the French revolution in 1779. M. Jules Ferry, who was then president of the council, considered that such an exhibition would be not alone good in itself, but tend to keep peace in Europe. On November 8, 1884, M. Jules Grevy, president of the republic, signed, upon the recommendation of M. Rouvier, minister of commerce, a decree that a universal exhibition should be opened in Paris on May 5, 1889, and should be closed on the 31st of October, in the same year. A deliberative commission was at the same time appointed to consider the best method of carrying out the project, and it recommended that other nations should be invited to take part in the exhibition, on the economical ground that it celebrated the French centennial of industrial freedom. Later on, under the Freycinet ministry, M. Lockroy, minister of commerce and industry, asked credits from the chambers for the purpose. The government resolved to leave the matter to private initiation, and that the whole cost of the enterprise should not fall upon the state, as in 1878. It pronounced, therefore, in favor of a system of organization by the state in alliance with a guarantee society, as in 1867, which had been found to work well. This society guaranteed the state eighteen million francs receipts, and gave certain guarantees in the event of the expenses exceeding the amount calculated. The society acted by means of a board of control and finances, composed of eight municipal councilors, seventeen senators, deputies, and agents of the state, and eighteen subscribers to the guarantee fund, each commissioner representing one million francs. This commission enjoys, with the state and municipal council, the right of being consulted by the minister of commerce on all questions relating to the financial aspects of the exhibition. In short, the state has control of the exhibition, the city of Paris has a voice in the control, and the guarantee society does not lose sight of its capital. The state will be reimbursed to a large extent by the great circulation of money and extra surplus from its indirect imposts. The city of Paris will be largely reimbursed by increased receipts in octroi duties, and the guarantee society is safeguarded by the receipts of the exhibition. A law, dated July 6, 1886, sanctioned this combination, and a few days afterward, on the 28th of July, a decree regulated the organization of the services. M. Edward Lockroy, minister of commerce and industry, received the title of commissioner-general of the exhibition; M. Alphonse, that of director-general of the works; M. Georges Berger, that of director-general of the exploitation; and M. Grison, director-general of the finances. M. Bartet was appointed engineer-in-chief, MM. Contamin, J. Charton, and Perron have control of the metallic constructions, MM. Bouvard, Duturt, and Fornige are the architects of the exhibition, and MM. Laforcade and Lion have charge of the gardens and plantations. A ministerial order, dated August 26, 1886, appointed a consultative committee of three hundred persons, under the title of the grand council of the universal exhibition of 1889, and this was subdivided into twenty-two consulting committees to watch over various departments of the works. Foreign committees, established at the request of the French government, were each invited to be represented by a delegate charged to deal with questions interesting to the nation he represented. The minister and the commissioner-general do not correspond directly with foreign exhibitors.

The ground plan of the whole exhibition, published herewith, will make clear the general arrangement. The portions devoted to exhibits from Great Britain are represented by the darkest areas. The exhibition is divided into three great parts. One part, bounded on the north by the Trocadero, is on the north bank of the Seine, and devoted chiefly to exhibits relating to horticulture and arboriculture. It is connected with the chief part of the exhibition in the Champ de Mars by the Pont de Jena, and the main thoroughfare passes under the center of the Eiffel Tower—the positions of the four feet of which are represented in the map.

In that part of the exhibition which covers the Esplanade des Invalides are many scattered buildings. One of them is for miscellaneous exhibits, and some of the others for exhibits by the French naval and military authorities. Others are for exhibits from the French colonies. Places are being built in the Seine for floating exhibits of boats and ships. Some English steam-launches are expected to be there.

At one time the plan was under consideration of connecting the Champ de Mars and the Esplanade des Invalides with a railway denoted by the dotted line, R. R. Unfortunately for the public, this idea has been abandoned, and they will have to go an immense way round by the route marked W. Y. This length, however, will be traversed by a railway, which will carry passengers for a small fee.